Augmented Reality in Android

ECE 150/251

Augmented Reality VS Virtual Reality
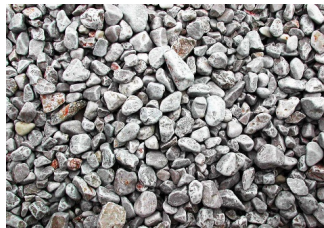
Augmented Reality VS Virtual Reality

	AR	VR
Camera	Essential	Not necessary
Delivery Method	Mobile devices	Head-mounted display
Alignment with real world	Yes	No
Android SDK	Vuforia	Google Daydream

Augmented Reality in Android
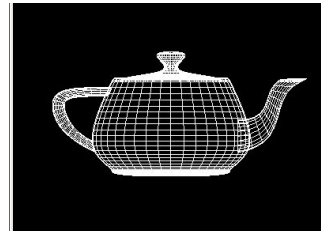

Vision-based localization technique

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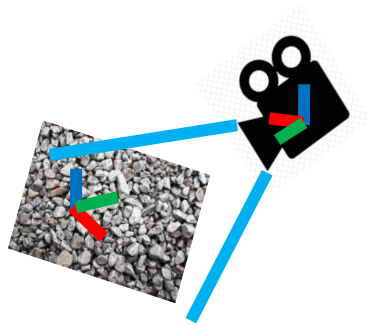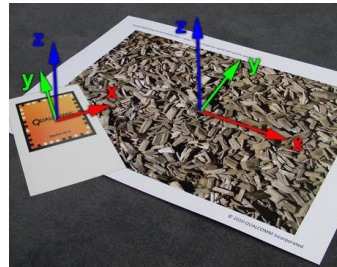Image Target   Camera   Computer Graphic   AR

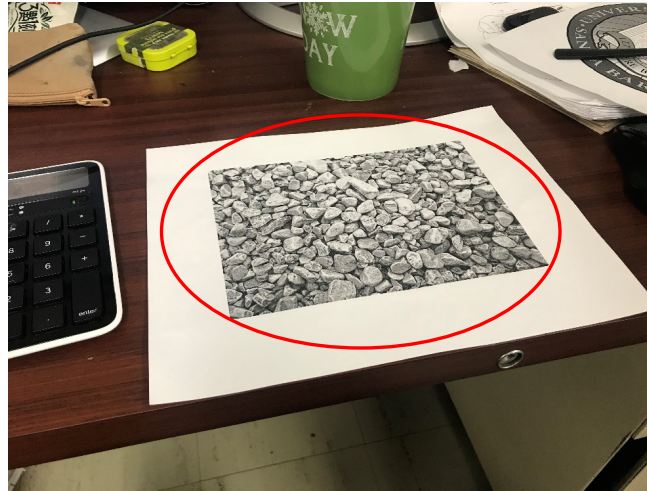# AR Workflow

Maker Detection

Camera Pose Estimation

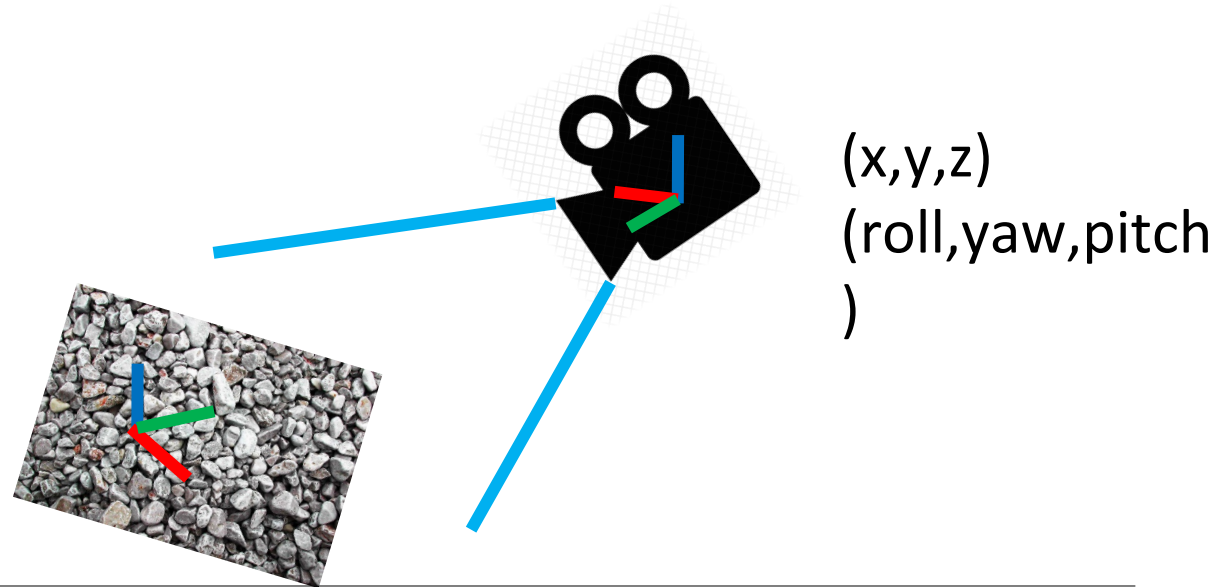Local Coordinate System Creation

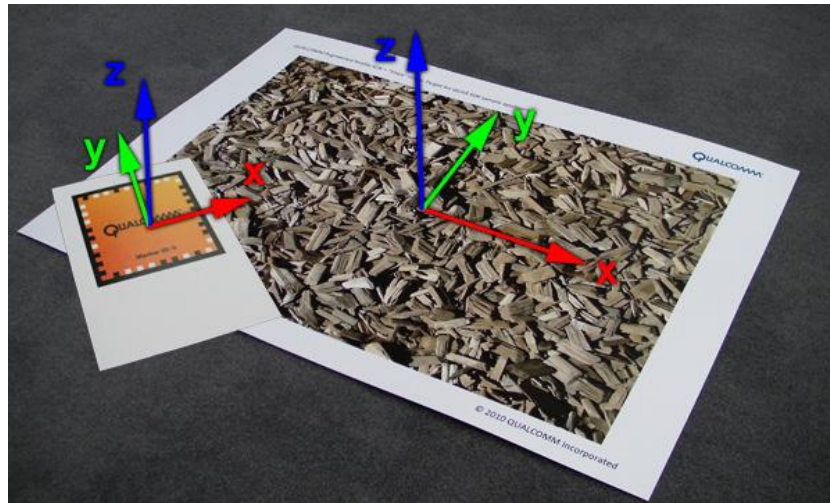Rendering

AR Workflow – Marker Detection

Marker is an image which contains key distinguishable features. These features are invariant to the location, rotation, and scale of the marker.

AR Workflow – Camera Pose Estimation

(x,y,z)
(roll,yaw,pitch)

Based on the image features, Vuforia can back project the image and estimate the location and the orientation of the camera relative to the mark in 3D space.

AR Workflow – Local Coordinate System Creation

Each image target and frame marker define a local coordinate system with (0,0,0) in the center (middle) of the target.
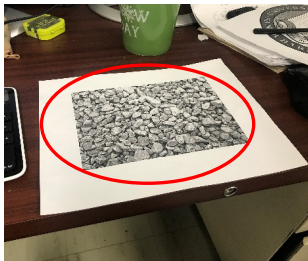
The Vuforia SDK uses right-handed coordinate system.
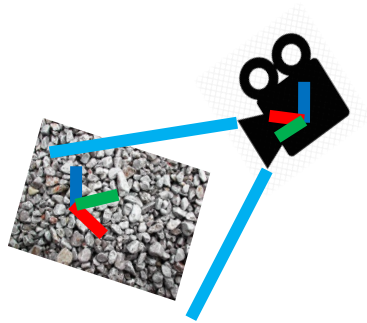
AR Workflow – Rendering

vuforia™

The final step is using graphics tool to render 3D objects and align to the local coordinate system of the marker.
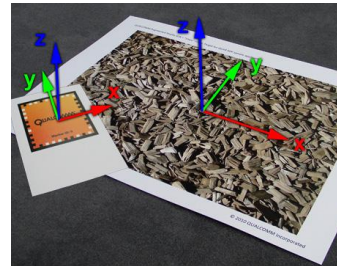
AR Workflow

Maker Detection

Camera Pose Estimation

Local Coordinate System Creation

Rendering

Demo

A demo shows how to set up Android Studio for Vuforia projects.

Demo - AR Snake UCSB

A project done by a student group in ECE 150 2017, downloaded from 'Google Play'

https://play.google.com/store/apps/details?id=com.ucsb.snake